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A.D. 1895. MAY 9. N<sup>o</sup>. 9230.

WOODLAND'S COMPLETE SPECIFICATION.

SHEET 1.

74242-14R

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FIG. 1.

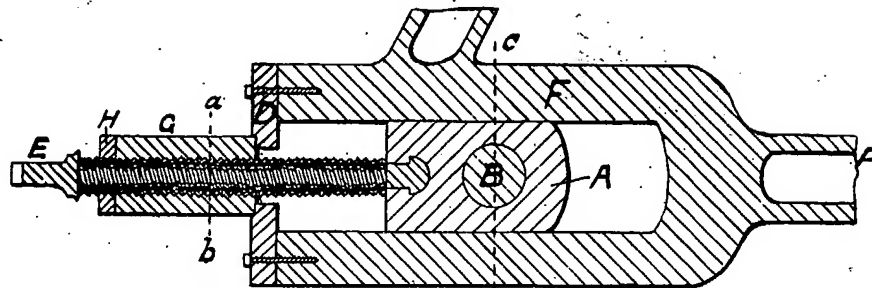


FIG. 2.

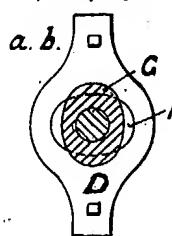


FIG. 3.

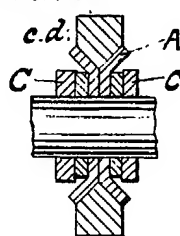


FIG. 4.

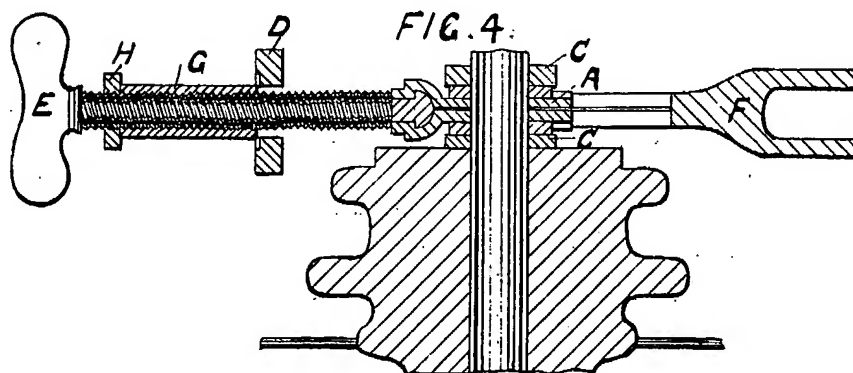
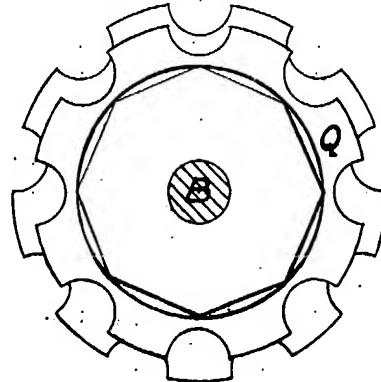


FIG. 5.



*Rev. A + Ch*

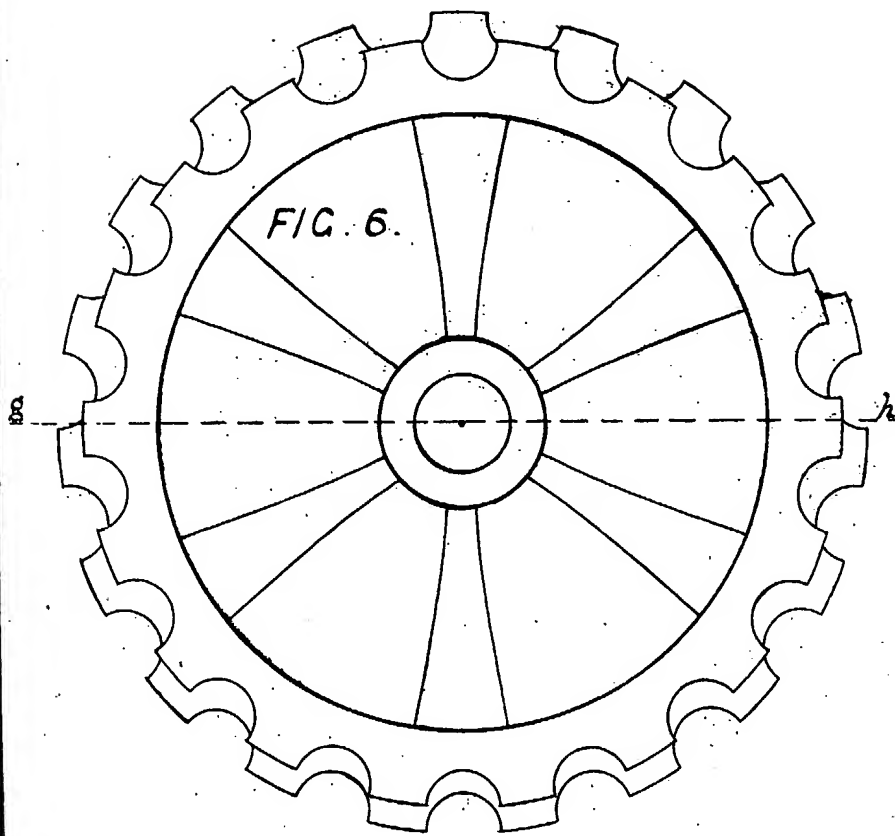
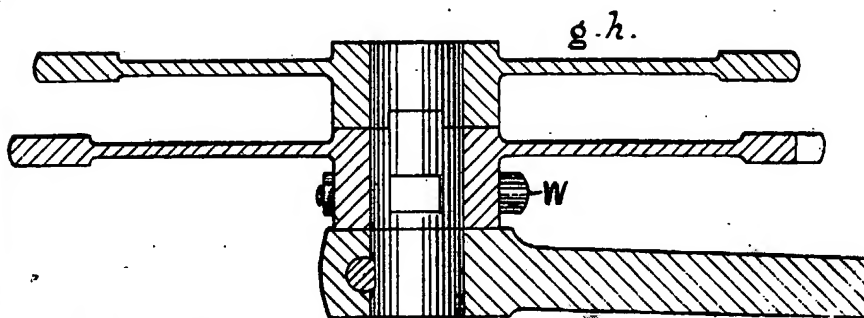


FIG. 7.



[This Drawing is a reproduction of the Original on a reduced scale.]

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5-3

FIG. 8.

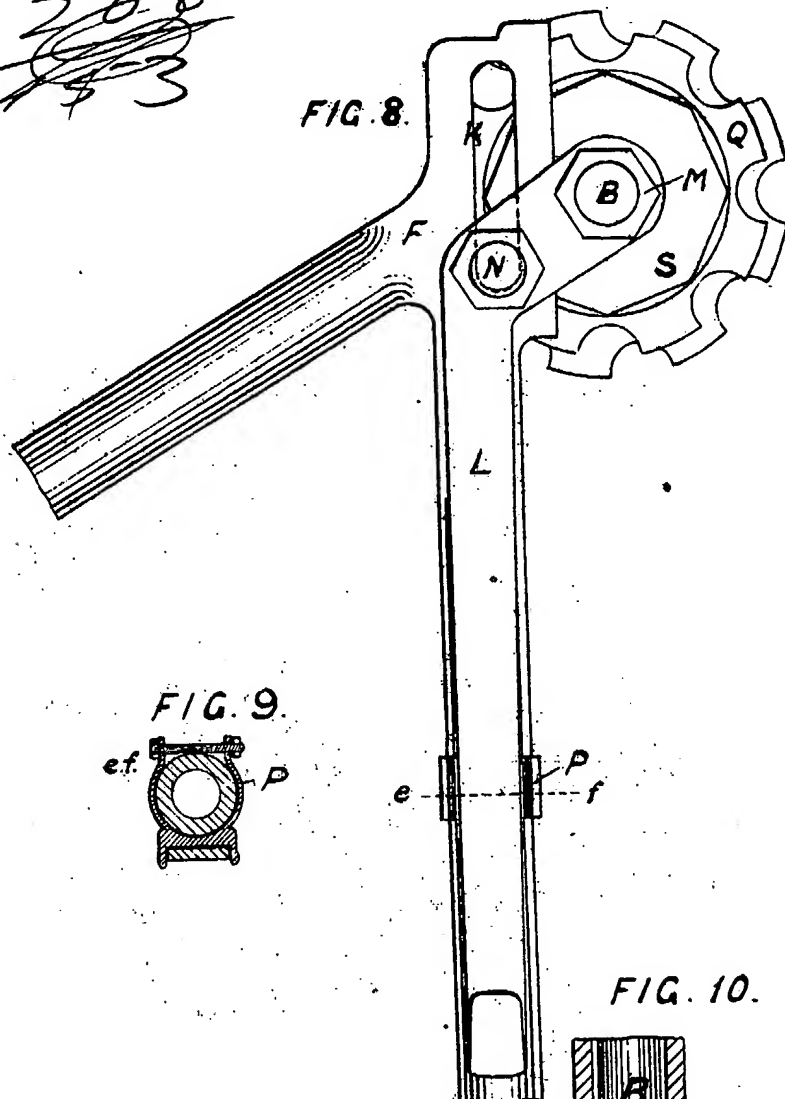
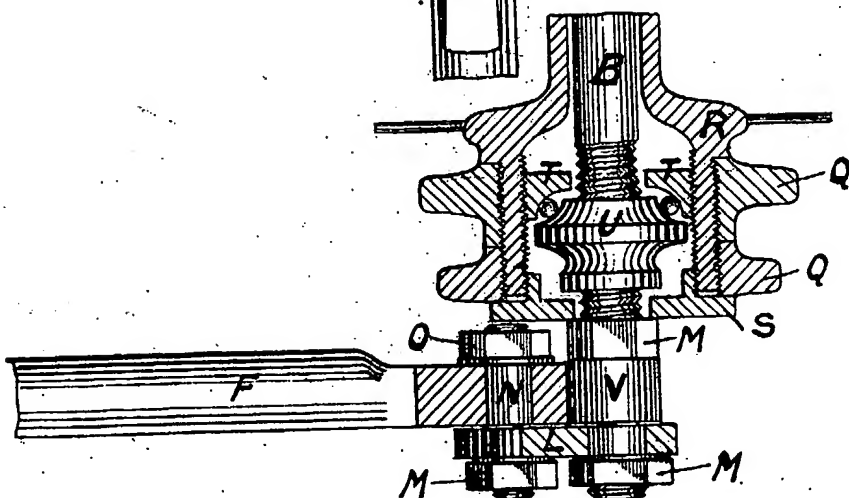


FIG. 9.



FIG. 10.



[This Drawing is a reproduction of the Original on a reduced scale.]

N° 9230



DUPLICATE.

A.D. 1895

Date of Application, 9th May.. 1895.

Complete Specification Left, 24th Sept., 1895—Accepted, 11th Jan., 1896

## PROVISIONAL SPECIFICATION.

## Improvements in Gearing for Velocipedes and other Machines.

WILLIAM MATTHEW WOODLAND Mason and Dealer in Building Materials, West Street, Dorking Surrey, do hereby declare the nature of this invention to be as follows:—

- Sliding collar D, for slackening chain as Fig. 1. Sheet 1. A screw with handle is attached to a disc made to slide in back fork or frame of machine to which the axil of driving wheel is firmly fixed as shewn; the screw passing through an oval collar D which can be moved to adjust endless chain and is kept in place by back nut H. To remove the chain turn the screw and collar D; the collar D will then pass through the oval hole in plate at back of fork and the disc and driving wheel will slide forward allowing enough slackness in endless chain for removing it from one sett of teeth to another sett; to replace the collar D draw the handle back and give it a half turn the collar D will then drop into a slot which will keep it in its place.

## TOOTHED WHEELS.

- A wheel with two or more rings of teeth as Fig. 2 Sheet 1. to be attached to driving wheel of machine and a wheel with 2 or more rings of teeth as Fig. 3 Sheet 2 to be attached to cranks the wheels to be connected by an endless chain. The gauge & pattern of toothing to be made to suit chains. The number of teeth can be arranged to suit gear required but the number of teeth on largest ring on crank wheel added to the number of teeth on smallest ring of wheel attached to driving wheel must be equal in number to the teeth on the smallest ring on crank wheel added to those on the largest ring on wheel attached to driving wheel. The collar D can be made to work as a screw with a coarse thread if preferred. For highest gearing the chain must run on largest ring of teeth on crank wheel and smallest ring of teeth on one attached to driving wheel. For lowest or slow gear the chain must run on the smallest ring of teeth on crank wheel and largest ring of teeth on one attached to driving wheel.

May 9th 1895.

WILLIAM MATTHEW WOODLAND.

## COMPLETE SPECIFICATION.

## Improvements in Gearing for Velocipedes and other Machines.

- WILLIAM MATTHEW WOODLAND Mason, and Dealer in Building Materials West Street, Dorking, Surrey, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

- My invention has for its object a ready and efficient means of changing the gearing of velocipedes driven by means of an endless chain and chain wheels, or rings of teeth; with special reference to safety bicycles; and consists of an arrangement of parts hereinafter described for that purpose.

[Price 8d.]

*Woodland's Improvements in Gearing for Velocipedes and other Machines.*

A chain wheel with two or more rings of teeth; or two or more chain wheels of which Fig. 6, is a view of inside face, or side nearest frame; Fig. 7, is a section of chain wheels shewing bore for axle, key, and nut, for fixing wheels, and in addition a portion of crank, the toothing in each wheel or ring of teeth must be of equal gauge and similar pattern, but with an unequal number of teeth is, or are firmly 5 attached to the crank axle by a pin, key W. or other means, just far enough apart to allow the chain to run freely on either wheel, or ring of teeth.

The pattern of wheel to be made to suit any chain that may be selected and the number of teeth to be according to the gearing required.

Two or more rings of teeth of the same pattern and gauge as those attached to the crank axle, to be firmly attached to the hub of driving wheel of velocipedes as shewn in Figs. 4 and 5 or in some other way; or the rings of teeth and hub of wheel may be cast in one piece, the number of teeth on one ring or wheel to differ from the number of teeth on the other; the number of teeth to be according to the gears required; but in all cases the number of teeth on the larger chain wheel Fig. 6 15 or the larger ring of teeth on the chain wheel attached to crank axle, added to the number of teeth on the smaller ring of teeth on chain wheel Figs. 4 and 5, attached to hub of driving wheel must be equal in number to those on the smaller wheel Fig. 6, or ring of teeth attached to the crank spindle added to the number on the larger ring of teeth attached to the hub of driving wheel; so that an endless chain may 20 without altering its length, work on either set of wheels at the same tension. The crank and bearings for same may be any of the kinds commonly used, the axle being long enough to receive two, or more wheels Fig. 7: or a wheel with two or more sets of teeth the whole being fixed to the frame of machine in the usual way.

A screw with handle Figs. 1 and 4 E, is attached to plates A made to slide in frame F of machine to which the axle B of driving wheel is firmly fixed by nuts C. Figs. 3 and 4. the screws E, passing oval collars G, which can be moved on screw E to adjust tension of endless driving chain, and is kept in place by the octagon 25 nuts H.

To alter the tension of chain loosen the nuts H and screw the collar G. forward, or backward as required then tighten the nuts H to keep the collar G in its place on screw E. To alter the gearing turn the screws E, this will also turn the collars G; which will then pass through the oval holes I in straps D at back of forks and the plates A with driving wheel attached will slide forward allowing 35 enough slackness in endless driving chain for its removal from one set of chain wheels Figs. 5 and 6 or rings of teeth to another. After shifting chain, replace the collar G by drawing the screw E back till the collar G has passed through the oval hole in strap D then turn it and the collar G will go forward into a slight slot in strap D which will keep it in its place. 40

If preferred the collar may be made to work with a coarsely threaded screw on the outside; this may be more convenient for ladies and children.

A modification of the foregoing by which the same result can be obtained more quickly is as follows.

In place of the screw arrangement Figs. 1. and 4. the back of frame F Figs. 8. 45 and 10. are made with a slot K and plain on the under side; the axle of driving wheel is firmly fixed to the levers L by nuts and washers M, which levers are fixed to frame F by bolts N passing through slots K the part of these bolts in slots are flattened on two sides and fitted to the slots with a shoulder on the outside and held in their place by nuts O on the inside of frame F Fig. 10. 50

To alter the tension of endless driving chain loosen the nuts O and move the levers L and bolt N forward or backward in the slots as required; then tighten the nuts O so that they keep the levers L from sliding in slots K; the levers L are made of thin metal at the end near clips P Fig. 9. so that they can be bent clear of the clips P which hold them in their place on frame F Fig. 8. 55

The chain wheels Fig. 6. on crank axle and Figs. 4. 5 and 8 on hub of driving wheel are to be as before described.

*Woodland's Improvements in Gearing for Velocipedes and other Machines.*

To alter the gearing bend the levers L clear of the clips P and raise them both at the same time; this will move the driving wheel Fig. 8 forward and give enough slackness in endless driving chain to allow of its being easily moved from one set of chain wheels Figs. 5 and 6 or rings of teeth to another.

35 After moving the chain, push the levers down so that they spring into the clips P which will keep them firmly in their place.

The bearings for driving wheel can be made in the usual way; but to reduce the strain on axle, I would place the bearings inside the rings of teeth as Fig. 10 by this way each ring of teeth Q is attached to the hub R of driving wheel by 10 a screw with a left handed thread; so that they can be easily renewed when worn or damaged; to prevent the rings of teeth coming off a cap S is fixed to the hub by an internal screw with a right handed thread; this cap is also to exclude dust from the bearings and can easily be removed for cleaning or renewing balls or bearings.

15 A portion of the bearing (a shaped ring T) is screwed into the hub R, so that it can be replaced, the cone portion of bearing U is screwed on to the axle B and can be tightened as required or removed for cleaning or repairs.

V. is a collar on axle B on which the frame F takes a bearing so that the downward pressure does not rest on the levers L, but on the axle B.

20 Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is

1. A combination of toothed chain wheels, two or more wheels or a wheel with two or more rings of teeth attached to crank axle or motive power; and two or 25 more wheels or rings of teeth attached to driving wheel so arranged that an endless chain without altering its length will work on two or more sets of the wheels or rings of teeth the gearing of each set of teeth or rings of teeth being different from the other, or others.

2. An arrangement by screws, slides, or levers, or a combination of two or all of 30 the foregoing by which the chain wheels or rings of teeth can be moved nearer the one to the other, so as to cause enough slackness in the endless driving chain to allow it to be easily moved from one set of wheels or rings of teeth to another, and the wheels or rings of teeth moved back into their place and firmly fixed.

3. A hub for driving wheel, with an external screw, with left handed thread, to 35 receive two or more rings of teeth; and an internal screw, with right handed thread, into which I screw a shaped ring to form a portion of ball bearings; also a cap to exclude dust from bearings, and to act as a back nut to rings of teeth to keep them in their place. I claim this part of the invention only in combination with the gearing as claimed in Claim 1.

40 Dated this Twenty-first day of September 1895.

WILLIAM MATTHEW WOODLAND.